

What is claimed is:

1. A seat buckle sensor assembly comprising:

a shield;

a sensor housing coupled to said shield, said sensor housing comprising a sensor for providing an output in response to magnetic flux imparted thereon; and

a magnet disposed on a lock pin of a seat belt buckle, said magnet disposed adjacent said sensor when said lock pin is in one of a locked and an unlocked state to cause a first output of said sensor, said magnet disposed away from said sensor when said lock pin is in the other of a locked and an unlocked state, to provide a second output of said sensor, said first output being different from said second output.

2. A sensor assembly according to claim 1, wherein said sensor housing comprises a stepped surface.

3. A sensor assembly according to claim 2, wherein said sensor housing comprises a rubber sheet disposed in said sensor housing maintaining said Hall Effect sensor in a predetermined position within said sensor housing.

4. A sensor assembly according to claim 1, wherein said shield comprises a housing and a cover, said housing comprising an opening adapted to receive a portion of said lock pin therethrough.

5. A sensor assembly according to claim 1, wherein said sensor comprises a Hall Effect sensor.

6. A sensor assembly according to claim 1, wherein said sensor is encapsulated within said sensor housing.

7. A sensor assembly according to claim 6, wherein an exterior of said sensor housing comprises at least one crush rib.

8. A seat buckle assembly comprising:

- a seat buckle configured to releasably retain a seat belt buckle tongue, said seat buckle comprising a lock pin, said lock pin movable between a first position when said seat buckle is in a locked state and a second position when said seat buckle is in an unlocked state;
- a shield comprising an opening, an end of said lock pin received through said opening;
- a sensor housing at least partially enclosed by said magnetic shield, said sensor housing comprising a sensor for providing an output in response to magnetic flux imparted thereon; and
- a magnet disposed on said end of said lock pin received through said opening, said magnet being in a first position relative to said sensor when said buckle is in a locked state to cause said sensor to provide a first output, and said magnet being in a second position relative to said sensor when said buckle is in an unlocked state to cause said sensor to provide a second output different from said first output.

9. An assembly according to claim 8, wherein said shield comprises a shield housing and a cover, and wherein said sensor housing is at least partially disposed with said housing and cover.

10. An assembly according to claim 9, further comprising a screw extending through said cover, said sensor housing and said shield housing, said screw engaged with said buckle.

11. A seat buckle sensor assembly comprising:  
a sensor housing comprising a Hall Effect sensor; and  
a magnetic shield covering at least a portion of said Hall Effect sensor;  
said magnetic shield secured to sensor housing by a snap fit.

12. An assembly according to claim 11, further comprising a seat buckle, and wherein said shield is coupled to said buckle for directing magnetic flux imparted on said shield to said seat buckle.

13. A method of determining a state of a seat buckle comprising:  
providing a seat buckle comprising a lock pin, said lock pin in a first position when said seat buckle is in a locked state and said lock pin in a second position when said seat buckle is in an unlocked state;

providing a seat buckle sensor assembly comprising a magnetic shield at least partially surround a sensor housing, said sensor housing comprising a sensor; and

providing a magnet disposed on an end of said lock pin, said magnet being in a first position relative to said sensor when said lock pin is in said first position and said magnet being in a second position relative to said sensor when said lock pin is in said second position;

said sensor providing a first output when said seat buckle is in a locked state and a second output when said seat buckle is in an unlocked state.

14. The method according to claim 13, wherein said sensor comprises a Hall Effect sensor.

15. A method of producing a sensor comprising:  
providing a housing having at least one lead extending therefrom;  
forming said at least one lead into an s-shape around at least a portion of said housing,  
inserting a pin through a hole in said housing adjacent said lead, thereby retaining said lead in said s-shape.

16. A method according to claim 15, wherein inserting said pin comprises:  
disposing said pin on the end of an installation tool;  
providing an alignment tool;  
passing said alignment tool through said hole in said housing and engaging said alignment tool with said pin;  
moving said installation tool, said pin, and said alignment tool to insert said pin through said hole in said housing.

17. A method according to claim 15, wherein forming said at least one lead into an s-shape comprises:

providing a tool including an indentation in a working end;  
engaging said working end with said at least one lead and said housing, thereby deforming said at least one lead into an s-shape;  
wherein said indentation is at least partially aligned with said hole in said housing.

18. A method of forming a seat buckle sensor comprising:

providing a sensor housing;  
providing a printed circuit board including a potting hole extending therethrough;  
disposing said printed circuit board at least partially within said housing;  
introducing a potting resin through said potting hole;  
curing said resin.

19. A method according to claim 18, further comprising introducing said potting resin on an outer surface of said printed circuit board prior to curing said resin.

20. A printed circuit board comprising:

at least one solder pad comprising an inspection configured to fill with solder when a lead is attached to said solder pad;

at least one alignment hole extending through said circuit board, said at least one alignment hold adapted to receive an alignment pin of a housing; and

a potting hole extending through said circuit board, adapted to allow injection of a potting resin through said circuit board.